

CLAIMS

1. Method for incorporating at least one photochromic additive in a finished or semi-finished ophthalmic article comprising a transparent polymer substrate containing at least one free plasticizer, which comprises :
 - introducing a supercritical fluid into a reactor containing the ophthalmic article and the photochromic additive to be incorporated ;
 - maintaining the supercritical fluid in the reactor, in a static state, for a predetermined period of time, in order to obtain the incorporation of the photochromic additive in the polymer substrate of the ophthalmic article to a predetermined depth ;
 - removing the supercritical fluid ; and
 - recovering the ophthalmic article in which the photochromic additive has been incorporated.
- 15 2. Method according to claim 1, wherein the polymers of the transparent substrate are selected from the group consisting of allylic polymers, polyol (allyl carbonate) polymers, polyacrylates, poly(alkyl acrylate)s, vinyl polymers, polyurethanes, polythiourethanes and polycarbonates.
- 20 3. Method according to claim 1, wherein the temperature of the supercritical fluid is lower by at least 30°C than the glass transition temperature, under normal conditions, of the polymer or polymers of the substrate.
- 25 4. Method according to claim 3, wherein the temperature of the supercritical fluid is lower by 50°C than the glass transition temperature, under normal conditions, of the polymer or polymers of the substrate.
5. Method according to claim 1, wherein the duration of maintenance of the supercritical fluid in the reactor is between 1 and 30 minutes.
- 30 6. Method according to claim 1, wherein the duration of maintenance of the supercritical fluid in the reactor is from 5 to 20 minutes.
7. Method according to claim 1, wherein the supercritical fluid is carbon dioxide.
- 35 8. Method according to claim 1, wherein the plasticizer is selected from the group consisting of linear or branched phthalates, C₁₈-C₃₀ fatty acid esters and poly(ethylene glycol)dibenzoates.

9. Method according to claim 1, wherein the ophthalmic article is a spectacle lens.

10. Method according to claim 1, wherein the ophthalmic article is a contact lens.

5 11. Method for the photochromization of a finished or semi-finished ophthalmic article comprising a transparent polymer substrate containing a free plasticizer which comprises :

A. A first stage comprising :

- the insertion into a reactor of a transparent polymer substrate and of a plasticizer for the substrate,
- the introduction into the reactor of a supercritical fluid,
- the maintenance of the supercritical fluid in the reactor, in a static state, for a predetermined period of time, in order to obtain the incorporation of the plasticizer in the polymer substrate, and
- the removal of the supercritical fluid ; and

15 B. A second stage comprising :

- the insertion into the reactor containing the plasticized polymer substrate of one or more photochromic compounds ;
- the introduction of a supercritical fluid,
- the maintenance of the supercritical fluid in the reactor, in a static state, for a predetermined period of time, in order to obtain the incorporation of the photochromic compound or compounds in the plasticized polymer substrate of the ophthalmic article to a predetermined depth,
- the removal of the supercritical fluid, and
- the recovery of the ophthalmic article in which the photochromic compound or compounds are incorporated.

20 12. Method according to claim 11, wherein the polymers of the transparent substrate are selected from the group consisting of allylic polymers, polyol (allyl carbonate) polymers, polyacrylates, poly(alkyl acrylate)s, vinyl polymers, polyurethanes, polythiourethanes and polycarbonates.

25 13. Method according to claim 11, wherein the temperature of the supercritical fluid is lower by at least 30°C than the glass transition

temperature, under normal conditions, of the polymer or polymers of the substrate.

14. Method according to claim 13, wherein the temperature of the supercritical fluid is lower by 50°C than the glass transition temperature,
5 under normal conditions, of the polymer or polymers of the substrate.

15. Method according to claim 11, wherein the duration of maintenance of the supercritical fluid in the reactor is between 1 and 30 minutes.

16. Method according to claim 11, wherein the duration of
10 maintenance of the supercritical fluid in the reactor is from 5 to 20 minutes.

17. Method according to claim 11, wherein the supercritical fluid is carbon dioxide.

18. Method according to claim 11, wherein the plasticizer is selected from the group consisting of linear or branched phthalates, C₁₈-C₃₀ fatty
15 acid esters and poly(ethylene glycol)dibenzoates.

19. Method according to claim 11, wherein the ophthalmic article is a spectacle lens.

20. Method according to claim 11, wherein the ophthalmic article is a contact lens.

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